

INFLUENCE OF PREPLANT GROWTH REGULATOR HERBICIDES ON SOYBEAN DEVELOPMENT AND YIELD. Joseph L. Matthews, Bryan G. Young, Dean E. Riechers, and Gordon K. Roskamp, Researcher and Professor, Department of Plant, Soil and Agricultural Systems, Southern Illinois University, Carbondale, IL 62901, Associate Professor, Department of Crop Sciences, University of Illinois, Urbana, IL 61801, and Professor, Department of Agriculture, Western Illinois University, Macomb, IL 61455.

Field research was conducted at Belleville, Champaign, and Macomb, IL in 2006 and 2007 to evaluate the effect of various rates of 2,4-D and dicamba applied preplant to soybean with and without soil residual herbicides. Additionally, some herbicide treatments were repeated on more than one soybean variety to determine if the response to herbicide treatment changed with soybean variety. Evaluations on soybean included days to 90% emergence, population, developmental growth stage, visual injury at 14, 21, 28, 42, 56, and 84 days after planting (DAP), and grain yield. Data were subjected to stepwise multiple regression to determine which in-season evaluation was most predictive of yield reduction. Data were also subjected to factorial ANOVA to determine if soil residual herbicide treatments and soybean variety influenced yield reduction.

The extent of delayed soybean emergence, population reduction, delayed development, visual injury symptoms and the associated yield reduction varied by location and year, but overall there was a strong correlation of yield reduction with reduced population, delayed development and visual injury evaluated at 28 DAP. The best overall predictor of yield reduction was a natural log transformation of population. The prediction model was further improved equally by adding either the linear, quadratic and cubic transformations of visual injury at 28 DAP or by adding soybean developmental stage at 28 DAP. When soybean population was removed from the model, visual injury was a better predictor of yield reduction than developmental stage when both evaluations were made at 28 DAP. Duration of soybean injury, as expressed by developmental delays at 56 and 84 DAP, was also a good predictor of yield reduction. Failure to reach 90% emergence by 14 DAP was indicative of substantial yield reduction.

Although soil residual herbicides in addition to the plant growth regulator (PGR) herbicides 2,4-D or dicamba reduced soybean population and yield in three of six site-years, combining soil applied herbicides with a PGR herbicide did not reduce yield to a greater extent than either herbicide applied alone. Differences between soil residual herbicides were most evident when no PGR herbicides were applied or when the PGR herbicide rate was low. Differences between soil residual herbicides were minimal when injury was high and population was severely reduced by a PGR herbicide.

Soybean variety influenced population and yield in three of six site-years when no PGR herbicide was applied. Interactions between soybean variety and PGR herbicide rate were not evident. Interactions between soybean variety and PGR herbicide type were evident in one of six site-years with a difference in varietal response to dicamba.